

We Claim:

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1. A blood processing system comprising  
a source of blood cells,  
a blood cell storage container,  
a source of an additive solution for blood cells,  
5 a blood component collection flow channel  
communicating with the blood cell storage container and  
including an in-line filter to remove leukocytes from  
blood cells before entering the blood cell storage  
container,  
10 a pumping mechanism communicating with the blood  
component collection flow channel, and  
a controller to operate the pumping mechanism in  
different modes, including a first mode to convey blood  
cells from the blood cell source into the blood component  
15 collection flow channel and a second mode for conveying  
additive solution from the additive solution source into the  
blood component collection flow channel, the controller  
including a function to alternate the first and second  
modes.
2. A system according to claim 1  
wherein the function alternates the first and  
second modes to achieve a desired ratio between blood cell  
volume and additive solution volume in the blood cell  
5 storage container.
3. A system according to claim 1  
wherein the function terminates the first mode  
when a desired volume of blood cells has been conveyed from  
the blood cell source and operates the pumping mechanism in  
5 the second mode to flush residual blood cells from the  
filter into the red blood cell storage container.
4. A system according to claim 1  
wherein the pumping mechanism includes a fluid  
pressure actuated pump and an actuator to apply fluid  
pressure to the pump.

- 5           5. A system according to claim 1  
            wherein the pumping mechanism includes a fluid  
            pressure actuated pump housed within a cassette and an  
            external actuator to receive the cassette and operate the  
            fluid pressure actuated pump, and  
            wherein the controller is coupled to the external  
            actuator.
6. A system according to claim 1  
            wherein the filter includes a fibrous filter  
            medium.
7. A system according to claim 1  
            wherein the filter includes a filter medium and a  
            housing enclosing the filter medium.
8. A system according to claim 7  
            wherein the housing comprises a flexible  
            material.
9. A system according to claim 8  
            further including a fixture to restrain expansion  
            of the housing during operation of the pumping mechanism.
- 5           10. A system according to claim 1  
            wherein the controller includes a function to  
            derive a value reflecting volume of blood cells present in  
            the blood cell collection container after passage through  
            the filter as a percentage of volume of blood cells conveyed  
            from the red blood cell source to the filter.
11. A system according to claim 1  
            wherein the blood cells comprise red blood cells.
- 5           12. A blood processing method comprising the  
            steps of  
            (a) conveying blood cells from a blood cell  
            source into a blood component collection flow channel that  
            includes a blood cell storage container and an in-line  
            filter to remove leukocytes from blood cells before entering  
            the blood cell storage container,  
            (b) conveying additive solution from an additive

10 solution source into the blood component collection flow  
channel, and

(c) alternating steps (a) and (b).

13. A method according to claim 12  
wherein step (c) alternates steps (a) and (b) to  
achieve a desired ratio between blood cell volume and  
additive solution volume in the blood cell storage  
5 container.

14. A method according to claim 12  
further including a step (d) comprising  
terminating step (a) when a desired volume of blood cells  
has been conveyed from the blood cell source and performing  
5 step (b) to flush residual blood cells from the filter into  
the blood cell storage container.

15. A method according to claim 12  
further including a step of holding the filter in  
a restraining fixture during steps (a) and (b).

16. A method according to claim 12  
further including a step of deriving a value  
reflecting volume of blood cells present in the blood cell  
collection container after passage through the filter as a  
5 percentage of volume of blood cells conveyed from the blood  
cell source to the filter.

17. A method according to claim 12  
wherein the blood cells comprise red blood cells.